

REMARKS

This Amendment is filed in response to the Office Action mailed on September 12, 2005. All objections and rejections are traversed.

Claims 1 to 65 are in the application and currently pending

Claims 21 to 50 are allowed.

Claims 51 to 65 are added to better claim the invention.

Claim Rejections – 35 U.S.C § 103

At paragraph 2 of the Office Action, claims 1, 5, 7, 10, 14, and 16 were rejected under 35 U.S.C 103(a) as being unpatentable over Li et al. U.S. Patent No. 6,631,420 issued on October 7, 2003 (hereinafter Li), in view of Cheng et al., US Patent Application Publication 2002/0150094, published on October 17, 2002 (hereinafter Cheng), and Akhtar U.S. Patent No. 6,418,139 issued on July 9, 2002 (hereinafter Akhtar).

The present invention, as set out in representative claim 1, comprises in part:

1. A method for restoring adjacencies between a router and its neighbors during reload of routing software on the router, the method comprising the steps of:

placing an interface of the router in a predetermined state that enables the router to receive incoming Hello packets from its neighbors over a computer network;

creating a unicast Hello packet in response to receiving an incoming Hello packet from each neighbor; and

sending the unicast Hello packet to each neighbor from whom it has received an incoming Hello packet to thereby prevent the neighbor from dropping its adjacency with the router.

Li discloses a method for a router to reboot, and after reboot to re-establish adjacencies lost during reboot. See col. 10, lines 17-24. After a router reboots, it immediately sends a Hello message with a new Generation Identifier value in the option field for neighbors to detect its reboot. See col. 3, lines 55-61 and col. 9, lines 46-54. The neighbor then sends a unicast Hello message to the rebooting router to re-establish lost adjacencies. See col. 10, lines 17-24.

Cheng discloses a Hierarchical Level-based IP Multicasting (HLIM) system for multicasting data packets from a source to a number of receivers in a network. HLIM is divided into a number of levels N, where N is the highest level, and each router has its own hierarchical level. When a Hello_Randtime expires, the highest HLIM (N) sends a HLIM_Conf_Hello multicast to all routers in the subnet. When an intermediate HLIM router (N-1 to 1) receives the HLIM_Conf_Hello, the intermediate HLIM sends a response (HLIM_Hello_Reply) to the highest HLIM router. Once the highest HLIM receives the reply, the HLIM_Randtimer is restarted.

Akhtar discloses utilizing the Hello protocol for a router to detect its neighbors and form adjacencies with some of its neighbors. See col. 6, lines 36-55. The router maintains a link state database table of its local state including usable interfaces and adjacencies with neighbors. See col. 6, lines 57-62. The router periodically sends a link state

advertisement distributing its local state and adjacencies to allow neighboring routers to synchronize their link state database accordingly.

The Applicant respectfully urges that Li, Cheng, and Akhtar are all silent concerning the Applicant's claimed invention of *placing an interface of the router in a pre-terminated state that enables the router to receive incoming Hello packets . . . creating a unicast Hello packet in response to receiving an incoming Hello packet . . . sending the unicast Hello packet to each neighbor from whom it has received an incoming Hello packet to thereby prevent the neighbor from dropping its adjacency with the router.*

Cheng discloses sending a response Hello message upon receiving a Conf_Hello message, but does not disclose Applicant's *sending the unicast Hello packet to each neighbor from whom it has received an incoming Hello packet to thereby prevent the neighbor from dropping its adjacency with the router.* Applicant's invention receives Hello packet from *each neighbor*, whereas Cheng only receives packets from an upper and lower router.

Additionally, the Examiner states that paragraphs 261 to 274 shows the routing of hello packets. Paragraphs 261 to 274 state:

“Configuring D_IF and U_IF for a HLIM Router
[0261] At boot time, each of the highest HLIM routers at the highest hierarchical level N sets a Hello_RandTimer to the [Hello_Randtime]. For configuring a D_IF and U_IF for every HLIM Router, the following op-

erations are proceeded:

[0262] If the Hello_RandTimer expires, the highest HLIM router will:

[0263] (1) send a HLIM_Conf_Hello to all of its interfaces except its L_IF (we assume that the L_IF is already predefined). A HLIM_Conf_Hello is multicast to all the other HLIM routers in the same core subnet. If the D_IF for the highest HLIM router has been already assigned, the message is sent only to the D_IF; and,

[0264] (2) set its HLIM_Hello_Timer to [Hello_interval] and wait for a HLIM_Hello_Reply. If the HLIM_Hello_Timer expires, it will retransmit the HLIM_Conf_Hello.

[0265] If an immediate descendant HLIM router (i.e., the second highest HLIM router, the level of which may be N or N-1) receives the HLIM_Conf_Hello through one of its interfaces, it will:

[0266] (1) assign that interface as its U_IF and the other interface as its D_IF;

[0267] (2) Reply with a HLIM_Hello_Reply through the U_IF; and,

[0268] (3) set a Hello_RandTimer to [Hello_Randtime].

[0269] If the highest HLIM router (which sent the HLIM_Conf_Hello) receives a HLIM_Hello_Reply through one of its interfaces, it will:

[0270] (1) Stop its HLIM_Hello_Timer; and,

[0271] (2) assign that interface as its D_IF and the other interface as its U_IF.

[0272] If one of the other highest HLIM routers receives the HLIM_Conf_Hello from one of its interfaces (other than the L_IF), it will restart its Hello_RandTimer and wait for a HLIM_Hello_Reply or HLIM_Conf_Hello.

[0273] If the Hello_RandTimer expires at one of the other highest HLIM routers, the router will:

[0274] (1) send a HLIM_Conf_Hello to the interface opposite to the one from which the previous HLIM_Conf_Hello was received; and,."

The above statement describes a system where a router that only receives Hello_Conf messages from upper hierarchical routers and only replies to the Hello_conf message to the upper hierarchical messages. For the lower hierarchical levels, this router is sending the Hello_Conf message. In sharp contrast, Applicant's invention is replying to all Hello packets received from *each neighbor*.

Furthermore, Li and Akhtar disclose the routing protocol software on the router sending Hello messages to re-establish adjacencies with neighboring routers, Applicant novelly claims the interface of the router sending Hello messages to neighboring routers. Li discloses the routing protocol sending a Hello message for a neighbor to re-establish lost adjacencies with neighbors after a reboot. Akhtar discloses the routing protocol sending Hello message to detect neighbors and form adjacencies with neighbors when a router starts. Neither Li nor Cheng nor Akhtar disclose the interface of the router sending Hello messages while the router reloads its routing protocol software ***to thereby prevent the neighbor from dropping its adjacency with the router.*** The Applicant describes the advantage of maintaining adjacencies with its neighbor routers at page 5, lines 4-9 of the specification, stating:

A goal of a NSF-capable router is to continue forwarding traffic during re-start/reload of control plane software, such as the OSPF routing protocol software, so that the reload is transparent to the router's neighbors. Accordingly, the present invention provides a backward-compatible technique that allows the router to identify its neighbors after reload of routing protocol software to thereby maintain its adjacencies with its neighboring routers.

Accordingly, the Applicant respectfully urge that Li, Cheng, and Akhtar, taken either singly or in combination, are legally insufficient to make obvious the presently claimed invention under 35 U.S.C. § 103 because of the absence of the Applicant's claimed novel ***placing an interface of the router in a predetermined state that enables the router to receive incoming Hello packets . . . creating a unicast Hello packet***

in response to receiving an incoming Hello packet . . . sending the unicast Hello packet to each neighbor from whom it has received an incoming Hello packet to thereby prevent the neighbor from dropping its adjacency with the router.

In the event that the Examiner deems personal contact desirable in disposition of this case, the Examiner is encouraged to call the undersigned attorney at: (617) 951-3067.


All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,


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